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RBBR Model: A prediction model of bank health level based on risk for Regional Development Banks (BPD) in Indonesia

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A B S T R A C T

The Risk-Based Bank Rating (RBBR) Model is a risk-based bank rating model. First of all, this study was conducted to find a model that can be used for predicting bank soundness and the level of bank health especially the Regional Development Banks (BPD) in Indonesia. Secondly, it tried to see the level of ability to moderate GCG (Good Corporate Governance) variables on the relationship between bank business risk and bank soundness. Thirdly, it had to see the level of ability to mediate GCG variables on the relationship between bank profitability and bank soundness. This study used BPD in Indonesia as a population and all members of the population studied, thus it is a census study. The variables consist of business risk (liquidity risk, credit risk, market risk and operational risk), GCG score and earnings performance and capital performance as the independent variables and bank soundness as the dependent variable. The secondary data were collected by means of documentation method. Data analysis includes descriptive analysis and statistical analysis, to describe the results of research, and statistical analysis to answer the research problem. Statistical analysis Partial Least Square (PLS) Warp and multiple linear regression analysis were used for analysis, and it was found that the model can be used to predict the health of BPD in Indonesia. Furthermore, GCG neither moderate the relationship between business risk and BPD health levels in Indonesia nor mediates the relationship between earnings performance and BPD health levels in Indonesia.

A B S T R A K

Model Risk-Based Bank Rating (RBBR) adalah model pemeringkatan bank berbasis risiko. Pertama, penelitian ini dilakukan untuk mengetahui model yang dapat digunakan untuk memprediksi tingkat kesehatan bank dan tingkat kesehatan bank khususnya Bank Pembangunan Daerah (BPD) di Indonesia. Kedua, penelitian ini melihat tingkat kemampuan memoderasi variabel GCG (Good Corporate Governance) pada hubungan antara risiko bisnis bank dan kesehatan bank. Ketiga, mengetahui tingkat kemampuan memoderasi variabel GCG pada hubungan antara profitabilitas bank dan kesehatan bank. Penelitian ini menggunakan BPD di Indonesia sebagai populasi dan semua anggota populasi yang diteliti, sehingga merupakan studi sensus. Variabel terdiri dari risiko bisnis (risiko likuiditas, risiko kredit, risiko pasar dan risiko operasional), skor GCG dan kinerja laba dan kinerja modal sebagai variabel independen dan kesehatan bank sebagai variabel terikat. Data sekunder diperoleh melalui dokumentasi. Analisis data meliputi analisis deskriptif dan analisis statistik, untuk menggambarkan hasil penelitian, dan analisis statistik untuk menjawab permasalahan penelitian. Analisis statistik Partial Least Square (PLS) Warp dan analisis regresi linier berganda digunakan untuk analisis. Ditemukan bahwa model yang diperoleh dapat digunakan untuk memprediksi kesehatan BPD di Indonesia. Selain itu, GCG tidak memoderatori hubungan antara risiko bisnis dan tingkat kesehatan BPD di Indonesia atau menengahi hubungan antara kinerja pendapatan dan tingkat kesehatan BPD di Indonesia.

1. INTRODUCTION

Indonesia needs to have a sound banking industry in order that the bank functions as a financial intermediary can run well and this is expected to

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contribute positively to the state's economy. Banks operating in Indonesia are always assessed for their health by supervisors beginning in 2014 conducted by the Financial Services Authority (OJK). The health rating system in Indonesia has changed from CAMELS approach to Risk-Based Bank Rating (RBBR) approach. RBBR uses four aspects as the material of bank's health assessment, which is risk profile, Good Corporate Governance (GCG), earnings, and capital.

The prediction model of the level of health is necessary to predict early on the health of a bank. Research on the prediction model of bank soundness has been done by the previous researchers, but still get different results and after a change in approach in the assessment of bank health in Indonesia, there has been no research that examines the prediction model of bank soundness.

During the period of 2009 to year 2015 there is still a problem about the health of Regional Development Banks (BPD) in Indonesia as evidenced by the score and health rating that tend to decrease (Infobank: 2010-2016) Background is what makes researchers interested in doing research on BPD health in Indonesia.

This study is directed to find a mathematical model that is the development of predictive models of bank soundness found by previous researchers used primarily by BPD management to predict the soundness of a managed bank.

This study also tries to examine the moderating impact of GCG on the relationship between business risks faced by banks and, especially Regional Development Banks (BPD) health in Indonesia, and examine the impact of mediation on the relationship between earning performance and BPD health in Indonesia.

The objectives of this research are: 1) Test and analyze the effect of credit risk as measured by CKPN's financial ratios on Credit and NPL, credit risk as measured by IRR and NOP financial ratios, liquidity risk as measured by financial ratio of LDR, IPR and LAR operational risk as measured by financial ratio of BOPO and FBIR, GCG implementation quality measured by GCG self-assessment composite score, earning performance measured by ROA, ROE and NIM financial ratios and capital measured by CAR and FBIR to health scares. In that case, it can be used as predictors for the bank-health-prediction model which is Risk-based for Regional Development Banks in Indonesia; 2) Test and analyze the moderate impact of GCG on the relationship between business risks faced by the bank and the health scores of the Regional Development Banks in Indonesia; 3) Test and analyze the mediation impact of GCG on the relationship between rentability and health scores of the Development Banks in Indonesia.

2. THEORETICAL FRAMEWORK AND HYPOTHESES

The rating of bank soundness in Indonesia has undergone refinement from initially using CAMELS approach to risk-based approach (RBBR) with the issuance of PBI number 13/1/PBI/2011. This was eventually enhanced by POJK number 04/POJK.03/2016 Stipulates that bank soundness rating includes aspects of risk profile faced by banks, GCG implementation, profitability and capital performance.

Risk is either a predictable or unpredictable potential event that negatively affects the bank's income and capital (Veithzal Rivai et al. 2013: 549). In addition, understanding the risk implies that the risk is still in the condition of being potential so that it can be used to manage risk and then minimize the occurrence of risk events as well as minimize the loss (risk loss).

Researchers in risk management, for example Barriga & Rosengren (2004); Koch & MacDonald (2000; Crouhy, Galai & Mark (2000); Karpaviciene (2006); Rowe & Jovic (2004); Sollenberger (2004) found that the risks facing banks must be well managed (Cvilikas 2010).

The legal basis for the application of risk management in the banking industry in Indonesia is Bank Indonesia Regulation (PBI) number 5/8/PBI/2003 which is then refined by PBI number 11/25/PBI/2009 and repayable with POJK number 18/POJK.03/2016 on the Implementation of Risk Management for Commercial Banks.

POJK number 18/POJK.03/2016 provides that commercial banks in Indonesia are required to manage 8 (eight) types of risk, of which four are credit risk, market risk, liquidity risk, operational risk can be measured using data from reports Bank finance and four others namely legal risk, reputation risk, strategic risk and compliance risk cannot be measured using data from bank financial statements. This study only examines the risks that can be measured through bank financial statements.

Credit risk is a risk that occurs due to the failure of the counterparty to fulfill its obligations. Credit risk can be sourced from various functional activities of such banks

Credits (provision of funds), treasury and investment as well as trade financing recorded in

banking book or trading book (Veithzal Rivai et al. 2013: 563). The financial ratios used to measure credit risk in this study are the ratio of CKPN to Credit and NPL. The ratio of CKPN and NPL negatively affects credit risk and adversely affects the bank soundness, so credit risk adversely affects the bank soundness.

H1: Credit risk has a significant and negative effect on the health of BPD in Indonesia.

Market risk is the risk arising from the movement of market variables from the portfolio owned by the bank, which can harm the bank. Market variables are the interest rates and exchange rates, including the derivation of both types of market risk, namely the change in the option price (Veithzal Rivai et al. 2013: 563). The financial ratios used to measure market risk in this study are IRR ratios. IRRs can have a positive or negative effect on market risk (interest rate risk) and may influence positively or negatively on the bank's soundness so that the effect of interest rate risk on the soundness of the bank can be positive or negative.

H2: Market risk significantly affects the health of BPD in Indonesia.

Liquidity risk (liquidity risk) is a risk caused by the bank is not able to meet all obligations that mature (Veithzal Rivai et al. 2013: 576). The financial ratios used to measure liquidity risk in this study are the ratio of LDR, IPR and LAR. LDR, IPR and LAR can negatively affect liquidity risk and can positively affect bank soundness, so the effect of liquidity risk to bank soundness is negative.

H3: Liquidity risk has a significant and negative effect on the health of BPD in Indonesia.

Operational risk is the risk due to inadequacy and/or malfunction of internal processes, human error, system failure, and/or any external event affecting bank operations. Besides, operational risk can also be on any functional activity of the bank (Veithzal Rivai et al. 2013: 579). In this case, the financial ratios are used to measure operational risk in this study that includes such as BOPO and FBIR ratios. BOPO has a negative influence on bank soundness, but FBIR has a positive influence on bank soundness.

H4: Operational risks have a significant and negative impact on the health of BPD in Indonesia.

It is noted that corporate governance is a form of relationship between the board of commissioners, the board of directors, stakeholders, and shareholders of a company including banks (Basel II 2004). Furthermore, GCG is a bank governance that applies transparency, disclosure principles), accountability, Responsibility (responsibility), independence, and fairness (PBI number 8/14/PBI/2006).

GCG can positively affect the bank soundness. This can happen because if in a bank has implemented GCG with high quality, it will have a positive impact on bank performance, which, in turn, will also improve the bank soundness.

GCG in this study bank is measured by using the composite value of self-assessment GCG as published by each bank. In connection with the relationship between the composite value and the predicate for GCG, it is inversely proportional. Then, in the analysis, the composite value is reciprocal. Thus the hypothesis can be as follows:

H5: GCG has a significant and positive effect on the health of BPD in Indonesia.

The performance of profitability (earnings) is a performance that shows the ability of banks to generate profits both from operational activities and from non-operational activities (Martono: 2013: 85). This earnings performance is one of the important aspects that need to get serious attention and good management by bank managers.

The financial ratios used to measure earnings performance are ROA, ROE and NIM ratio. ROA, ROE and NIM all three can positively affect the level of health of the bank because, with the increase of bank return, the health of banks will increase as well.

H6: The performance of earnings has a significant positive effect on the health of BPD in Indonesia.

Next is the solvency, which is the ability of banks to meet their long-term liabilities or the ability of banks to meet obligations in the event of bank liquidation (Lukman Dendawijaya 2009: 120). Capital is the funds invested by the owner in the framework of the establishment of a business entity intended to finance the business activities of the bank in addition to meeting regulations set by the monetary authority (Taswan: 2010: 214). The financial ratios used to measure bank capital capability in this study are CAR and FACR ratios. CAR has a positive effect on bank soundness, but FACR has a negative effect on bank soundness.

H7: Bank capital has a significant and positive effect on the health of BPD in Indonesia.

The relationship between risk, GCG, and bank soundness can be explained as follows. The risk is the potential loss due to the occurrence of a particular event (POJK number 18/POJK.03/2016). The risks that are faced by the banks today are very complex. Therefore, it is essential for the risk

management in a bank that aims to minimize losses caused by a certain event.

In addition, GCG is a bank governance that applies the principles of transparency, accountability, responsibility, independence, and fairness (PBI 8/14/PBI/2006). A bank that can implement GCG, means that the bank has implemented good governance, so it will be able to provide good results for the bank.

If the definition of risk and GCG is interrelated, it can be said that such as when implementing the risk management the bank can implement GCG principles, then the risk faced by the bank can be minimized. This means that the bank can also minimize losses caused by the adverse events. For that reason, it can be concluded that GCG can reduce the impact of risk experienced by banks. Based on this logic, it can be concluded that the risk that could have a negative impact on the health of the bank will be minimized by the implementation of GCG in the bank.

H8-11: GCG moderates the relationship between market risk, liquidity risk, credit risk, and operational risk of the health of BPD in Indonesia.

The relationship between rentability, GCG, and bank soundness can be explained as follows:

> Profitability or profitability is the ability of banks in obtaining profit or profits both derived from operating activities and from non-operational activities (Martono: 2013: 90), Thus, the performance of bank profitability is a performance that shows the ability of banks in generating profits.

The performance of a bank related to profitability performance is inseparable from GCG applied in the bank. Increased bank rentability performance, will be able to make the bank able to design the structure and implement GCG better because of the following:

1. Banks may recruit commissioners, especially independent commissioners who are more competent to have a board of commissioners that performs very well for banks and provides many benefits to banks.
2. The Bank may recruit members of committees, especially members of independent committees in accordance with those stipulated in more competent provisions so as to have an audit committee, a risk monitoring committee and a remuneration and nomination committee that performs very well and may provide substantial benefits to the bank.
3. The Bank may provide an information system, which enables the implementation of GCG principles well.

Commissioners, directors, competent committees and reliable information systems will be able to realize GCG within the bank. In addition, banks will also be able to transparent financial and non-financial conditions, GCG implementation reports and internal reporting, so that ultimately will be able to improve bank health.

H12: GCG mediates the relationship between earning performance and BPD health levels in Indonesia.

The conceptual framework of this study is as shown in Figure 1. Figure 1 shows that the variables influenced are bank soundness, while the variables that influence are risk, GCG quality, earnings performance and bank capital.

3. RESEARCH METHOD

Framework

Based on the nature of the exploration of science, this research can be considered the type of applied research, because it investigates a problem with a particular purpose, which is to produce a mathematical model that can be used by the regional development banks (BPD) in Indonesia to predict Level of their soundness and bank health.

Based on the scientific explanation, this research is also the type of causal research, as it seeks to know the form of causal relationships between several variables.

Population, Sample, and Sampling Technique

The population in this study is a number of time deposits of 26 banks. In this study, all members of the population were investigated, so this study was a census study.

Variables and the Measurement

The variables analyzed in this research include dependent variable (Y) and the independent variable (X). The dependent variable (Y) is the bank's health score published by Infobank Magazine. The independent variable (X) is a business risk consisting of credit risk, market risk, liquidity risk and operational risk, GCG quality, earning performance and capital. Credit risk is measured by IRR financial ratios, liquidity risk is measured by financial ratio of LDR, IPR and LAR operational risk measured by BOPO and FBIR financial ratios, GCG implementation quality as measured By composite score, Self-assessment of GCG, earnings performance measured by ROA, ROE and NIM, and capital ratio as measured by CAR and FBIR. GCG implementation quality as measured by

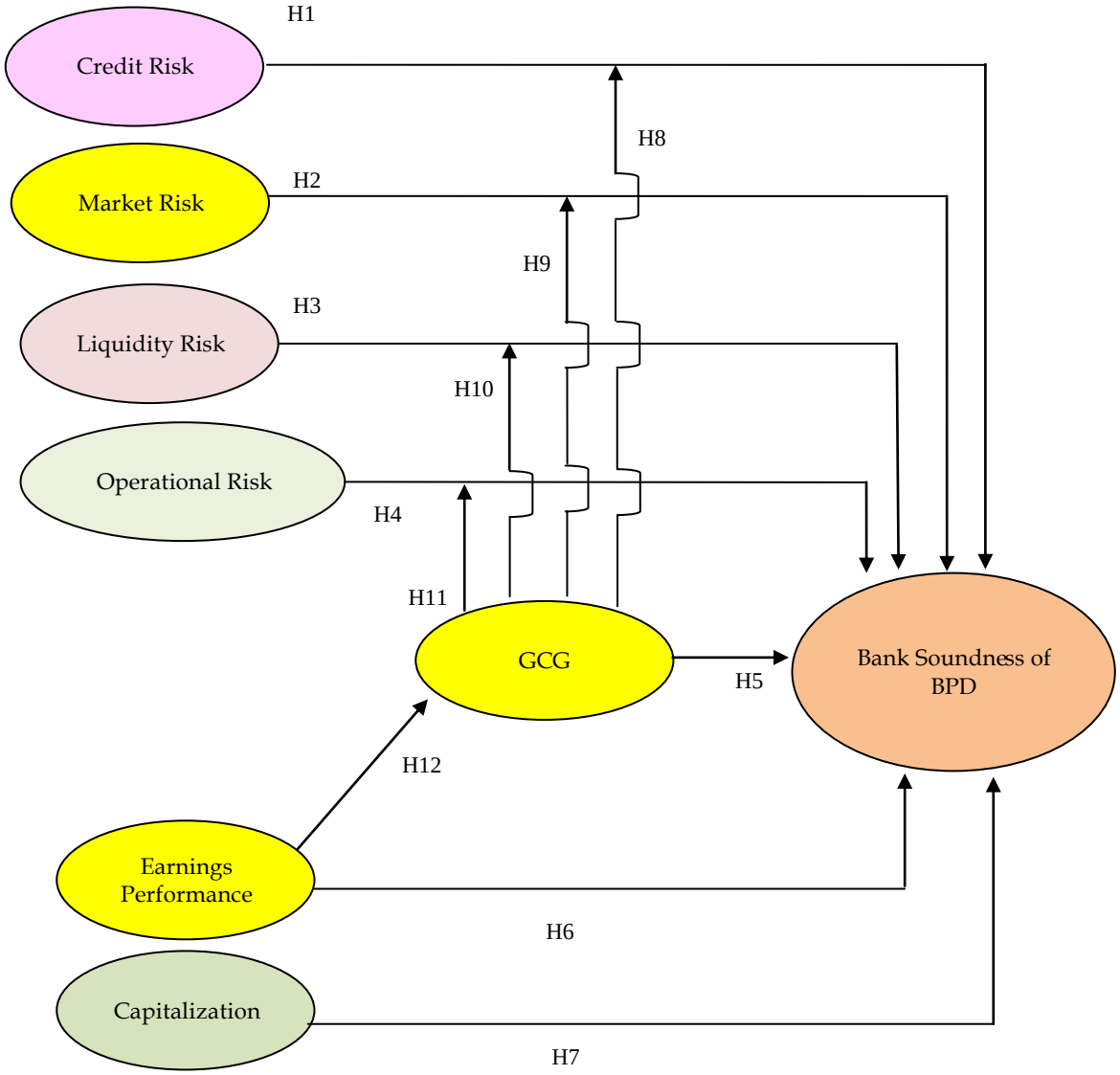


Figure 1
Conceptual Framework

GCG self-assessment composite score, earnings performance measured by financial ratio of ROA, ROE, and NIM and capital measured by CAR and FACR

Data Analysis Technique

A data analysis technique begins with data collection conducted by searching and downloading financial statements of regional development banks in Indonesia from 2010 to 2015 from the sites of Indonesian banks and OJK. Next, take the data necessary to be able to calculate the financial ratios that become research variables. For GCG data taken from bank annual report and health level data taken from Infobank magazine.

After the data for all research variables obtained, then conducted data analysis, which includes descriptive analysis and statistical analysis. Descriptive analysis is used to describe the results of research, and statistical analysis. Statistical analysis techniques used are PLS Warp and multiple linear regression analysis.

4. DATA ANALYSIS AND DISCUSSION

Research Subjects

This study used the population consisting of the Regional Development Banks in Indonesia, where this the time of this study was conducted with the total number of 26 banks. This study examines all members of the population, so this study is a census study. The banks that are used for the sample are BPD Lampung, Nusa Tenggara Barat's Regional Development Bank, BPD DIY, West Kalimantan BPD, South Kalimantan BPD, West Suma-

tera BPD, BPD South Sumatra and Belitung, BPD Riau and Riau Islands, BPD Bali, BPD Central Java, BPD East Kalimantan, BPD DKI, BPD East Java, BPD West Java and Banten, BPD Bengkulu, BPD Central Sulawesi, BPD Maluku, Southeast Sulawesi BPD, Central Kalimantan BPD, North Sulawesi BPD, BPD Jambi, BPD NTT, BPD South Sulawesi and West, BPD Aceh, BPD North Sumatra and BPD Papua.

Descriptive Analysis

The following section describes the research variables, namely CKPN on credit, NPL, IRR, NOP, LDR, IPR, LAR, BOPO, FBIR, and GCG, ROA, ROE, NIM, CAR, FACR and health scores.

1. CKPN on credit

CKPN on credit is a comparison between CKPN on credit and total credit that captures the ability of bank management in managing credit risk. The greater this ratio indicates the greater the credit risk facing the bank.

The CKPN of BPD Credit in Indonesia over the study period on average was 2.73 percent and tended to increase as evidenced by the average positive trend of 0.09 percent. Thus, it can be concluded that during the study period, BPD in Indonesia as a whole tended to increase the credit risk.

CKPN for the highest credit is owned by BPD of Southeast Sulawesi of 16.04 percent. This indicates that Southeast Sulawesi BPD has the lowest credit quality so that Southeast Sulawesi BPD has the highest credit risk compared to other BPD banks.

CKPN on the lowest credit is owned by BPD of Jambi at 0.48 percent. This shows that BPD Jambi has the highest credit quality so that BPD of Jambi has the lowest credit risk compared to other BPD banks.

2. NPL

NPL is a comparison between Non-performing Loan to Total Loans that describes the bank's management capability in managing credit risk. The greater this ratio indicates the greater the credit risk facing the bank. NPLs held by BPD in Indonesia during the study period on average was 2.35 percent and tend to increase as evidenced by the average positive trend of 0.17 percent. Thus, it can be concluded that during the study period, BPD in Indonesia as a whole tended to increase the credit risk.

The highest NPL is owned by BPD of East Kalimantan at 6, 17 percent. This shows that BPD of East Kalimantan has the lowest credit quality so that BPD of East Kalimantan has the highest credit risk compared to other BPD banks.

The lowest NPL is owned by BPD of Central Java at 0.63 percent. This shows that BPD Central Java has the highest credit quality so that BPD Jawa Tengah has the lowest credit risk compared with other BPD bank.

3. IRR

IRR is a comparison between Interest Rate Sensitive Assets (IRSA) and Interest Rate Sensitive Liabilities (IRSL) which describes the ability of bank management in managing market risk due to change of interest rate. If the bank IRR is greater than 100 percent, the bank will be at risk if the interest rate decreases. If the bank IRR is less than 100 percent, the bank will be at risk if the interest rate increases.

It has been noted that the IRR owned by BPD in Indonesia, over the study period, on average was 96.63 percent and tended to increase as evidenced by an average positive trend of 2.34 percent. When referred to interest rates that have increased during the study period, BPDs in Indonesia with IRRs smaller than 100 percent face market risks due to changes in interest rates, while those with IRR greater than 100 percent do not face market risk due to changes in interest rates.

The highest IRR among BPDs with an IRR of less than 100 percent is owned by BPD Bali of 99.06 percent. This shows that BPD Bali has the lowest interest rate risk compared to other BPD banks.

Next is that the lowest IRR among BPDs with an IRR of less than 100 percent is owned by BPD Aceh at 84.55 percent. This shows that BPD Aceh has the highest interest rate risk compared to other BPD banks.

4. LDR

LDR is the ratio of Total Credits to Total Third Party Funds that describes the ability of bank management in managing liquidity risk. The greater this ratio indicates the smaller the liquidity risk facing the bank. LDR owned by BPD in Indonesia during the study period on average was 87.22 percent and tended to increase as evidenced by the average positive trend of 1.89 percent.

In the case above, it can be concluded that during the study period, BPD in Indonesia as a whole tended to decrease liquidity risk. In addition, the highest LDR is owned by BPD of South and West Sulawesi of 109.97 percent. This shows

that BPD South and West Sulawesi have the highest liquidity so that BPD South and West Sulawesi have the lowest liquidity risk compared to other BPD bank.

The lowest LDR is owned by BPD Papua of 64.13 percent. This indicates that BPD Papua has the lowest liquidity so that BPD Papua has the highest liquidity risk compared to other BPD banks.

5. IPR

IPR is a comparison between Total Investment in Securities with Total Third Party Funds that describe the ability of bank management in managing liquidity risk. The greater this ratio indicates the smaller the liquidity risk facing the bank. IPR owned by BPD in Indonesia during the study period averaged 9.67 percent and tended to increase as evidenced by an average positive trend of 2.86 percent. Thus, it can be concluded that during the study period, BPD in Indonesia as a whole has a tendency to decrease liquidity risk.

The highest IPR is owned by BPD Nusa Tenggara Barat of 32.43 percent. This shows that BPD West Nusa Tenggara has the highest liquidity so that BPD Nusa Tenggara Barat has the lowest liquidity risk compared to other BPD bank.

The lowest IPR is owned by BPD Jambi at 3.09 percent. This shows that BPD Jambi has the lowest liquidity so that BPD Jambi has the highest liquidity risk compared to other BPD banks.

6. LAR

LAR is the ratio of Total Credits to Total Assets that describes the ability of bank management in liquidity risk. The greater this ratio indicates the smaller the liquidity risk facing the bank. LAR owned by BPD in Indonesia during the study period was on average of 63.08 percent. It tended to increase as evidenced by the average positive trend of 0.68 percent. Thus, it can be concluded that during the study period, BPD in Indonesia as a whole tended to decrease liquidity risk.

The highest LAR is owned by BPD of South and West Sulawesi of 72.45 percent. This shows that BPD of South and West Sulawesi have the highest liquidity so that BPD South and West Sulawesi have the lowest liquidity risk compared to other BPD bank.

The lowest LAR is owned by BPD of Papua at 50.48 percent. This indicates that BPD Papua has the lowest liquidity so that BPD Papua has the highest liquidity risk is compared with other BPD banks.

7. BOPO

BOPO is a comparison between Operational Costs with Operational Income that describes the bank's management capability in managing operational risk. The greater this ratio indicates the greater the operational risks faced by the bank. BOPO owned by BPD in Indonesia during the study period was on the average of 68.34% and it still tended to increase as evidenced by the average positive trend of 1.00%. Thus, it can be concluded that during the study period, BPD in Indonesia as a whole tended to increase operational risk.

The highest BOPO owned by BPD of Jakarta (DKI) is 82.78 percent. This shows that BPD of DKI has the highest inefficiency so that BPD Sulawesi DKI has the highest operational risk compared to other BPD bank.

The lowest BOPO is owned by BPD of Papua at 50.48 percent. This shows that BPD Papua has the lowest inefficiency so that BPD Papua has the lowest operational risk compared to other BPD banks.

8. FBIR

FBIR is a comparison between Non-interest Operating Income and Operating Income which describes the bank's management capability in managing operational risk. The greater this ratio indicates the smaller the operational risks facing the bank. FBIR owned by BPD in Indonesia during the study period averaged 22.71 percent and tended to decline as evidenced by the average trend of 0.61 percent. Thus, it can be concluded that during the study period, BPD in Indonesia as a whole tended to experience an increase in operational risk.

The highest FBIR is owned by BPD of West Kalimantan at 43.07 percent. This shows that BPD of West Kalimantan has the lowest inefficiency so that BPD of Sulawesi and DKI have the lowest operational risk compared with other BPD banks.

The lowest FBIR is owned by BPD Bali at 3.96 percent. This shows that BPD Bali has the highest inefficiency so that BPD Bali has the highest operational risk compared to other BPD banks.

9. GCG Score

GCG Score is a score of the implementation of Good Corporate Governance (GCG) in a bank that describes the quality of management within the bank. The greater this score after being reciprocal indicates the higher the quality of management within the bank. The GCG scores owned by BPD in Indonesia over the study period averaged 0.59

percent and tended to decline as evidenced by an average positive trend of 4.97 percent. Thus, it can be concluded that during the study period, BPD in Indonesia as a whole tended to improve the quality of management.

The highest GCG score after re-checked is owned by BPD of North Sumatra of 1.81. This shows that BPD of North Sumatra has the highest management quality compared to other BPD banks.

The lowest GCG score after re-checked is owned by BPD Nusa Tenggara Barat by 0.40 percent. This indicates that BPD Nusa Tenggara Barat has the lowest management quality compared with with other BPD banks.

10. ROA

ROA is a comparison between Profit before Tax and Assets owned that describes the profitability or ability of bank management in generating profit before tax. The greater this ratio indicates the higher profitability of the bank in making the profit before tax by using the assets owned. ROA owned by BPD in Indonesia during the study period averaged 3.22 percent and tended to decline as evidenced by the average trend of 0.18 percent. Thus, it can be concluded that during the study period, BPD in Indonesia as a whole tended to decrease profitability.

The highest ROA is owned by BPD Nusa Tenggara Barat at 5.81 percent. This shows that BPD West Nusa Tenggara has profitability in terms of earning-profit before tax with assets owned the highest compared with other BPD banks.

The lowest ROA is owned by BPD Aceh of 0.92 percent. This shows that BPD Aceh has profitability in terms of earning-profit before tax with assets owned by the lowest compared with other BPD banks.

11. ROE

ROE is a comparison between Profit After Tax and Owned Capital that describes the profitability or ability of a bank to generate profit after tax by using its own capital. The greater this ratio indicates the higher the profitability or ability of bank management in generating profit after tax by using the capital owned. ROE owned by BPD in Indonesia during the study period averaged 28.31 percent and tended to decline as evidenced by the average trend of 1.70 percent. Thus, it can be concluded that during the study period, BPD in Indonesia as a whole tended to decrease profitability.

The highest ROE is owned by BPD of Nusa Tenggara Barat at 48.40 percent. This shows that BPD of West Nusa Tenggara has profitability in terms of profit after tax with the highest owned capital compared with other BPD banks.

The lowest ROE is owned by East Kalimantan BPD of 20.4 percent. This shows that East Kalimantan BPD has profitability in terms of profit after tax with the lowest owned capital compared with other BPD banks.

12. NIM

NIM is a comparison between Net Interest Income and Net Interest cost that describes profitability or bank management capability in generating interest-gain. The greater this ratio indicates the higher profitability or the bank's management capability in generating interest profits. The NIM owned by BPD in Indonesia during the study period averaged 9.47 percent and tended to increase as evidenced by the average positive trend of 0.50 percent. Thus, it can be concluded that during the study period, BPD in Indonesia as a whole tended to increase profitability.

The highest NIM is owned by BPD of South Sumatra and Belitung at 15.12 percent. This indicates that BPD of South Sumatra and Belitung have profitability in terms of yielding the highest net interest compared to other BPD banks.

The lowest NIM is owned by BPD DKI at 5.02 percent. This shows that East Jakarta BPD has profitability in terms of yielding the lowest net interest compared to other BPD banks

13. CAR

CAR is a comparison between Capital and Risk-Weighted Assets (ATMR) that describes the ability of banks to cover the risks faced with the capital they have. The greater this ratio indicates the higher the bank's ability to cover risks. CAR owned by BPD in Indonesia during the study period averaged 19.56 percent and tended to decline as evidenced by the average trend of 0.12 percent. Thus, it can be concluded that during the study period, BPD in Indonesia as a whole tended to decrease the capability of bank capital to cover the risk.

The highest CAR is owned by BPD of Central Sulawesi of 26.48 percent. This indicates that BPD of Central Sulawesi has the highest capability in covering the risks faced by its owned capital compared to other BPD banks.

The lowest CAR is owned by BPD of North Sumatra at 13.67 percent. This indicates that BPD

of North Sumatra has the lowest ability to cover the risks faced by its own capital compared to other BPD banks.

14. FACR

FACR is a comparison between Fixed Assets and Capital owned banks describing the portion of bank capital allocated for fixed assets reflecting capital allocated to earning assets to earn income. The higher this ratio shows the greater the allocation of capital to fixed assets, which means the smaller allocated to productive assets. FACR owned by BPD in Indonesia during the study period averaged 21.75 percent and tended to decline as evidenced by the average trend of 0.62 percent. Thus, it can be concluded that during the study period, BPD in Indonesia as a whole tended to increase in the distribution of productive assets.

The highest FACR is owned by BPD of South Sumatra and Belitung at 46.45 percent. This shows that BPD South Sumatra and Belitung have the lowest ability to earn income from productive assets compared with other BPD bank.

The lowest FACR is owned by BPD of Jambi at 10.08 percent. This shows that BPD of Jambi has the highest ability to earn income with earning assets owned compared with other BPD bank.

15. Bank Health/Soundness Score

Bank health or soundness score is a score that describes the level of health owned by a bank. The higher this ratio indicates the higher the health of the bank. Health scores owned by BPD in Indonesia during the study period averaged 88.71 percent and tended to decline as evidenced by the average trend of 1.43 percent. Thus, it can be concluded that during the study period, BPD in Indonesia as a whole tended to decrease the level of health.

The highest Bank Health Score is owned by West Kalimantan BPD of 95.51 percent. This shows that BPD of West Kalimantan has the highest level of health compared to other BPD banks,

The lowest Bank Health Score is owned by BPD of East Kalimantan of 72.88 percent. This shows that East Kalimantan BPD has the lowest level of health compared to other BPD banks

Statistical Analysis

The result of statistical analysis using WarpPLS Software and Multiple Linear Regression Analysis can be seen in Appendix 1, Appendix 2, and Appendix 3. It was found that the variables that have a significant influence on BPD Health Level in Indonesia are the credit risk, GCG, earning performance and capital since all the variables have the p-value less than 0.05.

Market risk variables, liquidity risk, and operational risk have an insignificant effect on the health of BPD in Indonesia because all of these variables have p-value greater than 0.05

GCG does not moderate the relationship between credit risk, market risk, liquidity risk and operational risk with the health of BPD in Indonesia because it has a p-value greater than 0.05.

GCG also does not mediate the relationship between rentability and the health of BPD in Indonesia because it has a p-value greater than 0.05.

The results of multiple linear regression analysis which is an advanced analysis of the analysis of WarpPLS obtained regression equation as follows:

Y = 82.832 – 0.031 CKPN – 0.411 NPL + 0.148 GCG + 0.126 ROA – 0.002 ROE – 0.004 NIM + 0.080 CAR – 0.028 FACR+ ei.

Discussion

The results of statistical analysis indicate that the variables that have significant influence on BPD Health Level in Indonesia are credit risk, GCG, rentability performance and capital performance, while market risk, liquidity risk and operational risk have insignificant influence to health level of BPD in Indonesia.

GCG does not moderate the relationship between credit risk, market risk, liquidity risk and operational risk with BPD health levels in Indonesia. GCG also does not mediate the relationship between rentability with the health of BPD in Indonesia.

The significant impact of credit risk on the health of BPD in Indonesia is because during the period of credit risk research is the biggest risk faced by BPD in Indonesia and tends to increase which can be proved by the positive trend both in CKPN ratio on Credit and also NPL ratio.

The insignificant effect of market risk on the health of BPD in Indonesia is because there are still many BPDs that are not yet foreign exchange banks, and therefore do not face the exchange rate risk. During the study period, more market movements occurred were changes in exchange rates, whereas changes in relative rates were insignificant or small.

No significant influence of liquidity risk on health level of BPD in Indonesia, because BPD can be said as regional treasury. Thus, there is little chance that BPD will not be able to meet its matur-

ing obligations. If BPD suffers from liquidity problems, then the local government will immediately provide assistance to the existing BPD in the region. BPD liquidity during the study period is well proved by increasing LDR, IPR and LAR ratios.

The insignificant effect of operational risk on the health of BPD in Indonesia is that, in its operations, BPD manages more local government finances, while public funds under management are much less than local government funds. In addition, there are still many BPD managing local government funds that are not too large in number, as evidenced by the small amount of capital owned by most BPD.

The significant impact of GCG on the health of BPD in Indonesia, because the implementation of GCG is an obligation for the management of BPD in Indonesia. It has been stipulated in the Bank Indonesia Regulation (PBI) and the Financial Services Authority (POJK) Regulation. Implementation of GCG in BPD in Indonesia is also a material evaluation by OJK in assessing the health level of BPD.

The significance of the effect of rentability on the health of BPD in Indonesia BPD's ability in generating profits can be said to be well proven from the average ROI, ROE and NIM ratios for the period of the research is much higher than the minimum standards, for example for ROA, The bank is said to be good if it has a minimum ROA of 1.5 percent, while the average ROA BPD during the study period has reached 3.22 percent.

The significant effect of the performance of the capital on the health of BPD in Indonesia, because the ratio of capital owned by BPD during the study period has been far above the minimum requirement. The ratio of CAR that should be owned by BPD is at least 8 percent of the RWA, whereas in fact, during the study period the average CAR of BPD in Indonesia was 19.56 percent.

If the regression equation generated from this study is examined more deeply, it can be seen that from the overall ratio used to measure the variables that have significant influence on the health level of BPD in Indonesia, it is known that there are three ratios that have the desired regression coefficient as expected, Namely CKPN on Credit, ROE and NIM. CKPN on Credit has a positive coefficient, it should be negative. This can happen because according to the theory if CKPN on Credit decreases, credit risk decreases, so health score on risk profile increases, and assuming no effect to health score from other aspects, the total health score will increase. Health score of BPD during the study period decreased as evidenced by the trend of 1.43.

5. CONCLUSION, IMPLICATION, SUGGESTION, AND LIMITATIONS

Based on the results of data analysis and discussion that has been raised, it can be drawn conclusion as follows:

1. Predictability model based on risk management that can be used to predict the health of BPD in Indonesia is:
   Y = 82.832 – 0.031 CKPN – 0.411 NPL + 0.148 GCG + 0.126 ROA – 0.002 ROE – 0.004 NIM + 0.080 CAR – 0.028 FACR+ ei.
2. GCG does not moderate the relationship between business risk and BPD health levels in Indonesia.
3. GCG does not mediate the relationship between productive and health levels of BPD in Indonesia.

The mathematical model created in this research can be used for bank management, banking industry supervisors, and society as a tool to predict the health of BPD. The omission of this research is that in collecting GCG data, in which the researchers have difficulty obtaining the data from several BPD sites, because in bank annual report is not explicitly explained GCG score. It is important that the researchers suggest that BPD management in Indonesia should pay more attention to credit risk that need to be encountered because it has a significant effect on the level of health by increasing CKPN on Credit with a smaller percentage of total credit increase. Bank management is also advised to increase nonperforming loans with a smaller percentage than the percentage increase in total loans.

BPD management in Indonesia is recommended to improve the quality of management, so that GCG scores are increasingly improved and managed banks are considered to apply GCG well.

BPD management in Indonesia is suggested to improve profitability by increasing profit before tax, profit after tax and interest income with percentage greater than percentage increase of profit, own capital and interest income.

BPD management in Indonesia is recommended to improve capital performance by increasing the amount of capital with a greater percentage than the percentage increase in RWA. BPD management in Indonesia is recommended to increase the allocation of capital to fixed assets

with a percentage smaller than the percentage increase in the allocation of funds to productive assets.

Indonesian banking supervisors (OJK) are advised to keep business risks, GCG, rentability performance and capital performance as a component of BPD level health in Indonesia.

The limitation of this study can be due to the subjects being investigated. This study examined the variables of analysis only in the Regional Development Banks (BPD) in Indonesia. For that reason, so it is necessary to conduct further research in another bank groups, such as Government Banks, Foreign Exchange National Private Banks, and the listed Banks in Indonesia Stock Exchange as well as the Sharia Banks.

REFERENCES

Altman, EI, Robert GH and P Narayan, 1977, 'Zeta Analysis: A New Model to Identify Bankruptcy Risk of Corporations', *Journal of Banking and Finance*, 29-54.

Aryati and Balafif, 2007, 'Analisa Faktor Yang Mempengaruhi Tingkat Kesehatan Bank Dengan Regresi Logit', *Jurnal Winner*, vol. 8 no. 2. 111-125.

Bank Indonesia, 2003, Peraturan Bank Indonesia (PBI) Nomor 5/8/PBI/2003 tanggal 19 Mei 2003, tentang Penerapan Manajemen Risiko Bagi Bank Umum, Jakarta, Bank Indonesia.

Bank Indonesia, 2006, Peraturan Bank Indonesia (PBI) Nomor 8/4/PBI/2006, tanggal 30 Januari 2006, tentang Pelaksanaan Good Corporate Governance (GCG) Bagi Bank Umum, Jakarta, Bank Indonesia.

Bank Indonesia, 2006, Peraturan Bank Indonesia (PBI) Nomor 8/14/PBI/2006 tanggal 5 Oktober 2006, tentang Perubahan atas PBI Nomor 8/4/PBI/2006, tentang Pelaksanaan Good Corporate Governance (GCG) Bagi Bank Umum, Jakarta, Bank Indonesia.

Bank Indonesia, 2009, Peraturan Bank Indonesia (PBI) No: 11/25/PBI/2009 tanggal 1 Juli 2009, tentang perubahan atas PBI Nomor 5/8/PBI/2003 tentang Penerapan Manajemen Risiko Bagi Bank Umum, Jakarta, Bank Indonesia.

Bank Indonesia, 2011, Peraturan Bank Indonesia (PBI) No: 13/1/PBI/2011 tanggal 5 Januari 2011, tentang Penilaian Tingkat Kesehatan Bank Umum, Jakarta, Bank Indonesia.

Basel Committee on Banking Supervision, 1988, International Convergence of Capital Measurement and Capital Standards, Basle, Basel Committee on Banking Supervision.

Basel Committee on Banking Supervision, 1996, Overview of The Amendment To The Capital Accord To Incorporate Market Risk, Basle, Basel Committee On Banking Supervision.

Basel Committee on Banking Supervision, 2004, International Convergence Of Capital Measurement and Capital Standards, A Revised Framework, International Convergence Of Capital Measurement and Capital Standards, A Revised Framework, Basle, Basel Committee on Banking Supervision.

Basel Committee on Banking Supervision, 2009, A global regulatory framework for more resilient banks and banking systems, Basle, Basel Committee On Banking Supervision.

Biro Riset Infobank, 2007-2014, 'Peringkat Kesehatan Bank-Bank di Indonesia', *Majalah Infobank*, Edisi Juni 2007-2014, Jakarta, Biro Riset Infobank.

Cvilikas, 2010, 'The Structure of Decision for banking Risk Management's Economic Efficiency Assessment', *Journal of Economic and Management*, Vol. 15.

Gilbert RA, Andrew PM, and Mark DV, 2002, 'Could a CAMELS Downgrade Model Improve Off-Siet Surveillance?', The Federal Reserve Bank of St. Louis.

Gunther and Moore, 2003, 'Early Warning Model in Real Time', *Journal of Banking & Finance*, 27 : 1979-2001.

Imam Gozali, 2006, *Analisis Multivariate dengan Program SPSS*, Semarang : Badan Penerbit Universitas Diponegoro.

Indira and Mulyaman, 1998, 'Memprediksi Kondisi Perbankan Melalui Pendekatan Solvency Secara Dinamis', *Buletin Ekonomi Moneter & Perbankan*, 2: 169-184.

Kasmir, 2012, 'Manajemen Perbankan', Cetakan Kesesebelas, Jakarta : PT. Raja Grafindo Persada.

Cyree KB, James WW and Thomas PB Ken B, 2000, 'Determinants of Bank Growth Choice', *Journal of Banking & Finance*, 24 : 709-734.

Lukman Dendawijaya, 2009, *Manajemen Perbankan*, Jakarta : Penerbit Ghalia Indonesia.

Martin D 1977, 'Early Warning of Bank Failure', *Journal of Banking and Finance*, 1 : 249-276.

Martono, 2013, *Bank dan Lembaga Keuangan Lain*, Yogyakarta: Penerbit Ekonisia.

Meyer and Piefer, 1970, 'Prediction of Bank Failure', *The Journal of Finance*, 853-868.

Sekaran Uma, 2007, *Research Methods for Business*, Fourth Edition, New York, John Wiley &

Sons.

Sigit Triandaru, Totok Budisantoso, 2008, *Bank dan Lembaga Keuangan Lainnya*, Edisi Empat, Salamba Empat, Jakarta.

Sinkey Joseph F Jr. 1975, 'A Multivariate Statistical Analysis of The Characteristics of Problem Banks', *The Journal of Finance*, XX : 21-36.

Sri Haryati and Djoko Budi S, 2000, 'Analisis Kinerja Bank-bank Beku Operasi, Takeover, Rekapitalisasi dan Bank Sehat Tahun 1992 -1998, *Ventura*, Volume 4 No, 2: 97-107.

Sri Haryati, 2005, 'Studi Tentang Model Prediksi Tingkat Kesehatan Bank Swasta Nasional Di Indonesia', *Jurnal Ekonomi Bisnis dan Akuntansi Ventura*, Volume 9 No. 3: 1-19.

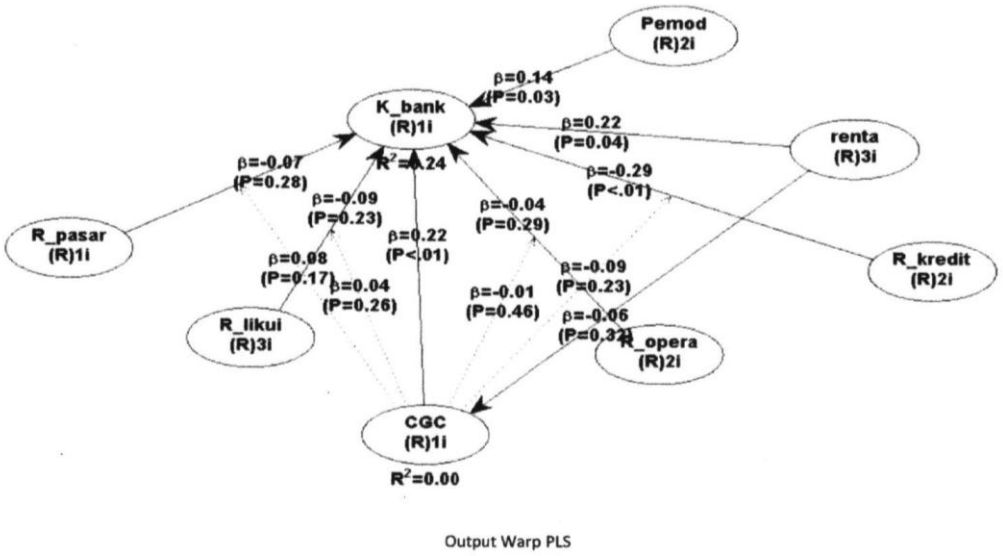
Taswan, 2010, *Manajemen Perbankan (Konsep, Teknik dan Aplikasi)*, Edisi Dua, UPP STIM YKPN Yogyakarta.

Veitzal Rivai, Syofyan Basir, Sarwono Sudarto, Arifiandy Permata Veithzal, 2013, 'Commercial Bank Management', *Manajemen Perbankan dari Teori ke Praktik*, Jakarta : PT. Raja Grafindo Persada.

Wimboh Santoso, 2000, 'The Determinants of Banks in Indonesia (An empirical Study', <htp://www.bi.go.id/bank>.

APPENDICES

Appendix 1
Results of Statistical Analysis of Each Hypothesis



Output Warp PLS

Appendix 2
Results of Statistical Analysis of Each Variable

P Coefficients

	R_kredit	R_pasar	R_likui	R_opera	GCG	R_rents	Pemod	K_bank	GCG*R_opera	GCG*R_likui	GCG*R_pasar	GCG*R_kredit
R_kredit												
R_pasar												
R_likui												
R_opera												
GCG						0.031						
R_rents												
Pemod												
K_bank	-0.296	0.058	-0.082	-0.033	0.186	0.233	0.125		-0.008	0.005	0.106	-0.076
GCG*R_opera												
GCG*R_likui												
GCG*R_pasar												
GCG*R_kredit												

P Values

	R_kredit	R_pasar	R_likui	R_opera	GCG	R_rents	Pemod	K_bank	GCG*R_opera	GCG*R_likui	GCG*R_pasar	GCG*R_kredit
R_kredit												
R_pasar												
R_likui												
R_opera												
GCG												
R_rents						0.399						
Pemod												
K_bank	0.002	0.312	0.231	0.333	0.002	0.028	0.026		0.454	0.467	0.165	0.263
GCG*R_opera												
GCG*R_likui												
GCG*R_pasar												
GCG*R_kredit												

Appendix 3
Statistical Analysis for Each Variable

Coefficients[1]

Model		Unstd. Coefficients		Std. Coefficients	t	Sig.	Correlations Zero order
		B	Std. Error	Beta			
1	(Constant)	82.832	5.113		16.200	.000	
	CKPN	-.018	.044	-.031	.402	.888	.014
	NPL.	-1.619	.343	-.411	-5.297	.000	-.433
	GCG	10.549	5.284	.148	1.997	.048	.112
	ROA	.909	.750	.126	1.213	.227	.251
	ROE	-.002	.083	-0.002	-.020	.984	.218
	NIM	-.009	.212	-.004	-.044	.965	.099
	CAR	.138	.151	.080	.916	.361	.087
	FACR	-.030	.084	-.028	-.355	.723	-.069